

CLAIMS

I claim:

1. An apparatus, comprising an insoluble support having a ligand attached thereto, wherein said ligand comprises bromosulfophthalein or a salt or ester thereof.
2. The apparatus of claim 1, wherein said insoluble support is contained in a container.
3. The apparatus of claim 1, wherein said insoluble support is supported in a container.
4. The apparatus of claim 2, wherein the container is selected from the group consisting of columns, bottles, filter plates, dishes, and plate inserts.
5. The apparatus of claim 3, wherein the container is selected from the group consisting of columns, bottles, filter plates, dishes, and plate inserts.
6. The apparatus of claim 1, wherein the support is selected from the group consisting of a support for a column, a support for a micro titre plate, column packing, a surface plate, a filter plate, a matrix, an affinity cartridge, and a membrane.
7. A method for producing an albumin-depleted sample, comprising:
providing a sample, which sample includes albumin;
running the sample over an insoluble support having attached thereto a ligand comprising bromosulfophthalein or a salt or ester thereof; and
allowing albumin from the sample to bind to the ligand, thereby providing the albumin-depleted sample.
8. The method of claim 7, further comprising collecting the albumin-depleted sample.
9. The method of claim 7, further comprising:
running the albumin-depleted sample over the insoluble support one or more additional times; and
allowing albumin from the albumin-depleted sample to bind to the ligand, thereby providing a further albumin-depleted sample
10. The method of claim 9, further comprising collecting the further albumin-depleted sample.
11. The method of claim 7, wherein the sample is selected from the group consisting of serum, plasma, and blood.
12. The method of claim 7, wherein the albumin is human serum albumin.

13. An albumin-depleted sample prepared by a method, wherein said method comprises:
 - providing a sample, which sample includes albumin;
 - running the sample over an insoluble support having attached thereto a ligand comprising bromosulfophthalein or a salt or ester thereof; and
 - allowing albumin from the sample to bind to the ligand, thereby providing the albumin-depleted sample.
14. The albumin-depleted sample of claim 13, wherein at least 80% by concentration of albumin from the sample binds to the ligand.
15. The albumin-depleted sample of claim 13, wherein at least 90% by concentration of albumin from the sample binds to the ligand.
16. The albumin-depleted sample of claim 13, wherein at least 95% by concentration of albumin from the sample binds to the ligand.
17. The albumin-depleted sample of claim 13, wherein the albumin is human serum albumin.
18. A method of binding a bromosulfophthalein ligand to an insoluble support, wherein said method comprises:
 - bringing bromosulfophthalein or a salt or ester thereof into contact with an epoxy-activated insoluble support under alkaline conditions to produce a bromosulfophthalein anion; and
 - allowing the bromosulfophthalein anion to react with the epoxy, such that the bromosulfophthalein binds to the insoluble support.
19. The method of claim 18, wherein the insoluble support comprises sepharose beads.
20. A method for making an apparatus for reducing the content of albumin in a sample, said method comprising attaching a ligand comprising bromosulfophthalein or a salt or ester thereof to an insoluble support.
21. The method of claim 20, wherein the sample is selected from the group consisting of serum, plasma, and blood.
22. The method of claim 20, wherein the insoluble support comprises sepharose beads.
23. The method of claim 20, wherein the albumin is human serum albumin.
24. A kit comprising an assembly, wherein said assembly comprises an insoluble support having attached thereto a ligand comprising bromosulfophthalein or a salt or ester thereof.

25. The kit of claim 24, further comprising a container.
26. The kit of claim 25, wherein said container is selected from the group consisting of columns, bottles, filter plates, dishes and plate inserts.
27. The kit of claim 24, wherein the support is selected from the group consisting of a support for a column, a support for a micro titre plate, column packing, a surface plate, a matrix, a filter plate, an affinity cartridge, and a membrane.
28. The kit of claim 27, further comprising one or more additional insoluble supports adapted to be capable of binding one or more non-albumin proteins.
29. The kit of claim 28, wherein the one or more additional insoluble supports include one or more supports selected from the group consisting of a support adapted to be capable of binding IgA and a support adapted to be capable of binding IgG.
30. The kit of claim 29, wherein the support is adapted to be capable of binding IgA.
31. The kit of claim 29, wherein the support adapted to be capable of binding IgG is selected from the group consisting of a Protein G cartridge, a Protein A cartridge, and a Protein A and G cartridge.
32. A method for producing a protein-depleted sample, comprising:
providing a sample, which sample includes albumin and one or more additional proteins;
running the sample over an insoluble support having a ligand comprising bromosulfophthalein or a salt or ester thereof;
allowing albumin from the sample to bind to the ligand;
running the sample over one or more insoluble supports adapted to be capable of preferentially removing one or more non-albumin proteins from the sample; and
allowing the one or more non-albumin proteins to be removed from the sample, thereby providing a protein-depleted sample.
33. The method of claim 32, further comprising collecting the protein-depleted sample.
34. The method of claim 32, further comprising:
running the protein-depleted sample over one or more of the insoluble supports one or more additional times; and
allowing additional proteins from the protein-depleted sample to be removed, thereby providing a further protein-depleted sample.

35. The method of claim 32, wherein the steps of running the sample over one or more other insoluble supports adapted to be capable of preferentially removing one or more non-albumin proteins from the sample and allowing the one or more non-albumin proteins to be removed from the sample are performed before running the sample over an insoluble support having a ligand capable of preferentially binding albumin and allowing albumin from the sample to bind to the ligand.

36. A method for producing a protein-depleted sample, comprising:
providing a sample, which sample includes albumin and one or more additional proteins;
and
running the sample over an insoluble support having a ligand capable of preferentially binding albumin and one or more ligands capable of preferentially binding one or more non-albumin proteins from the sample, thereby providing a protein-depleted sample.

37. A method for producing a protein-depleted sample, comprising:
providing a sample, which sample includes albumin and one or more additional proteins;
and
running the sample over an insoluble support having a ligand capable of preferentially binding albumin, wherein the support is adapted to be capable of preferentially removing one or more non-albumin proteins from the sample, thereby providing a protein depleted sample.

38. A protein-depleted sample produced by the method of claim 32.

39. A spin column, comprising:
a receiving tube; and
an inner column adapted to fit within said receiving tube, wherein the inner column comprises a column bottom and an albumin-binding resin, wherein the albumin-binding resin comprises one or more ligands capable of preferentially binding albumin selected from the group consisting of bromosulfophthalein, Cibacron Blue, Warfarin, and salts or esters thereof, and wherein the column bottom is in contact with the albumin-binding resin.

40. The spin column of claim 39, wherein the receiving tube comprises a lid adapted to seal the receiving tube.

41. The spin column of claim 40, wherein the lid is further adapted to seal the inner column.

42. The spin column of claim 39, wherein the column bottom comprises one or more flow directors.

43. A method for producing an albumin-depleted sample, comprising:
 - providing a spin column, which spin column comprises a receiving tube; and an inner column adapted to fit within said receiving tube, wherein the inner column comprises a column bottom and an albumin-binding resin, wherein the albumin-binding resin comprises one or more ligands capable of preferentially binding albumin selected from the group consisting of bromosulfophthalein, Cibacron Blue, Warfarin, and salts or esters thereof, and wherein the column bottom is in contact with the albumin-binding resin;
 - placing a sample that includes albumin in the inner column; and
 - maintaining the sample in the spin column for a period of time sufficient for albumin from the sample to bind to the albumin-binding resin in the inner column and to allow sample to flow through the inner column thereby producing an albumin-depleted sample.
44. The method of claim 43, wherein the sample is selected from the group consisting of plasma, serum and blood.
45. The method of claim 43, further comprising inserting the albumin-depleted sample into the inner column and maintaining the sample in the spin column for a period of time sufficient for albumin from the albumin-depleted sample to bind to the albumin-binding resin in the inner column, thereby producing a further albumin-depleted sample.
46. The method of claim 43, further comprising collecting the albumin-depleted sample.
47. A kit comprising a receiving tube having a lid and an inner column wherein the inner column comprises a column bottom and an albumin-binding resin.
48. The kit of claim 47, wherein the albumin-binding resin comprises one or more ligands capable of preferentially binding albumin.
49. The kit of claim 48, wherein the one or more ligands capable of preferentially binding albumin selected from the group consisting of bromosulfophthalein, Cibacron Blue, Warfarin, and salts or esters thereof.